

ADDEFFENDANT A

United States District Court  
Northern District of California

Case No. **4:20-cv-05640-YGR**

Case Title *Epic Games, Inc. v. Apple, Inc.*

Exhibit No. **DX-5550**

Date Entered

Susan Y. Soong, Clerk

By: , Deputy Clerk



# Impact of Apple's Vertical Practices on [REDACTED] Subscriber Base and Financial Performance

28 July 2016

Draft: Preliminary results for discussion purposes only. Results may change as we obtain further data and continue our analysis.

Privileged & Confidential. Attorney-client work product.

# SUMMARY AND AGENDA

Global Economics Group

2

# Agenda



- u Summary and Agenda
- u [REDACTED] Business Model
- u Apple's Vertical Restraints and Their Likely Effects on [REDACTED] Growth and Profitability
- u Estimates of the Impact of Apple's Vertical Restraints on [REDACTED] Subscribers Based on Natural Experiment: Two Natural Experiments
- u Financial Analysis of the Impact of Apple's Vertical Restraints on [REDACTED] Margin
- u Apple's App Store Business Model
- u Conclusion

## Summary of Natural Experiments on Foreclosure Effects



<sup>2</sup> **Apple's Vertical Restraints estimated to result in [REDACTED] loss of [REDACTED] paid subscribers between by 2019Q2.**

§ [REDACTED]

§ Based on difference-in-difference analysis of IOS and Android platforms both with [REDACTED] but with Apple vertical restraints applying to IOS but not Android.

§ Expect vertical restraints also foreclose other [REDACTED] rivals and anecdotal evidence supports that.

<sup>2</sup> **IAP test found significant impact on [REDACTED] ability to attract subscribers from relaxing a single IAP restraint**

§ Showing a link to a promotional offer on [REDACTED] in the iOS app increased [REDACTED] acquisition of IOS subscribers [REDACTED]

§ This is a test of the impact of only a single restraint. Relaxing other constraints would result in additional impact on [REDACTED]

§ This effects would be expected to increase over time with further development of [REDACTED]



## Summary of Financial Impact of Foreclosure Effects



- Foreclosure from Apple's vertical restraints measured by the iOS-Android natural experiment would prevent [REDACTED] from [REDACTED] and risk foreclosing [REDACTED] from operating global [REDACTED], based on analysis of [REDACTED] historic financials.

\$ [REDACTED]

- Apple's vertical restraints jeopardize [REDACTED] ability to secure risk capital necessary for building a global platform or continuing as a viable stand-alone business.

\$ [REDACTED] and other [REDACTED] rivals operate on thin gross contribution margins; modest changes in subscriber growth places them at significant financial risk.

\$ Apple's vertical restraints appear to have contributed to the financial distress of [REDACTED]

# BUSINESS MODEL

# Freemium Business Model for Global Streaming Music Service



- Ø [REDACTED] invests in attracting **free users**.
  - \$ Marketing costs only partly defrayed by advertising.
  - \$ Average contribution per free monthly user in 2016Q1 was [REDACTED]
  - \$ Free users are the major pipeline for obtaining premium users.
- Ø [REDACTED] invests in persuading people to join its premium paid service, which offers more robust features and [REDACTED] and become **paid subscribers**.
  - \$ Average contribution per paid subscriber in 2016Q1 was [REDACTED] This is where [REDACTED] makes money.
  - \$ [REDACTED] informs free users that they need to upgrade when free users attempt to try to feature only available to premium users.
  - \$ [REDACTED] provides various promotions such as 30-days free to free users to persuade them to upgrade.
  - \$ [REDACTED] also engages in significant promotions and market to persuade free users to upgrade and non-users to try the premium service.
- Ø [REDACTED] global margin depends on successfully executing this basic business model in multiple countries where in each country [REDACTED]  
[REDACTED]
- Ø [REDACTED] ability to obtain growth capital depends on investor beliefs about its subscriber and margin growth.

# Key Drivers of Growth and Profitability



- Ø Growth in free users who are the major source of paid subscribers.
  - § Most paid subscribers start as free users and upgrade.
  - § More free users results in more paid users over time for given conversion and churn rates.
- Ø High conversion rate from free
  - § Higher conversion rate generates more paid subscribers for given base of free users.
- Ø Low churn rate from paid
  - § Lower churn rate generates more paid subscribers from keeping existing subscribers.
- Ø [REDACTED]
  - [REDACTED]
  - [REDACTED]
- Ø To earn profits, the contribution from paid subscribers must be high enough to cover losses on free service including [REDACTED] promotion and marketing costs to acquire paid subscribers, minimum commitments, R&D, G&A, and other fixed costs.
  - § Business model results in thin contribution margins given that [REDACTED] of paid subscriber revenue paid to labels.
  - § Earning positive net margins challenging since [REDACTED] must support marketing and promotion in addition to covering fixed costs.

**[REDACTED] financial viability is particularly at risk from anticompetitive practices that reduce the level and growth of subscribers or raise its cost of acquiring free or premium subscribers. The same is true for other [REDACTED] startups.**





# APPLE'S VERTICAL RESTRAINTS AND WHY THEY MATTER

Global Economics Group

11

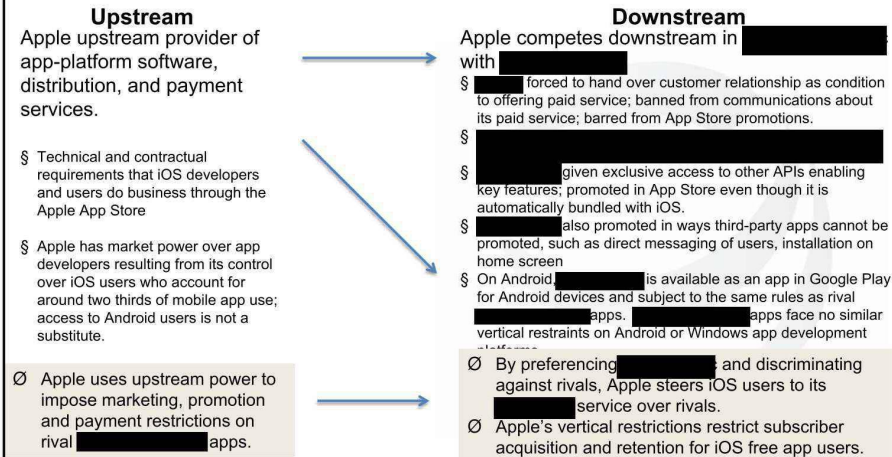
## Relevance of iOS Platform to Business Model

- Ø [REDACTED]
- Ø Users must have mobile app to [REDACTED] on mobile devices, which they get from Apple App Store for iOS devices and usually from Google Play for Android devices.
- Ø [REDACTED]
- Ø [REDACTED] encourages free users to upgrade to premium by limiting features to premium users; as a result, upgrades while [REDACTED] free are an important source of paid subscribers.
- Ø Distribution of [REDACTED] basic app in Apple App Store is necessary for [REDACTED] to attract and serve free users on iOS devices which in turn is critical to convert paid subscribers by for example denying free users access to key premium features.

**[REDACTED] could not survive as a business without iOS app distribution since it would not be able to provide [REDACTED] on devices that now account for [REDACTED]**



# Apple Uses Upstream Market Power to Impose Vertical Restraints that Affect Downstream Rivals



# Apple's Vertical Restraints and Their Impact on Rivals



| Vertical Restraints  | Details of Restraint   | Likely Effect on  |
|--|--|---|
| <b>Marketing Restraints:</b> Apple prevents [redacted] from communicating with users in-app and off-platform to convert free users to paid   | [redacted] is prohibited from linking to its website or informing users of discounts or promotions<br>[redacted] is prohibited from promoting or marketing its paid service through push notifications to free users on iOS.   | [redacted]  |
| <b>Payment Restraints:</b> Apple mandates use of Apple's IAP, with [redacted] for efforts to convert free to paid subscribers in order to control [redacted] payment relationship with customers.  | Apple alone has control of the payment relationship with the customer which is important for subscription-based models.<br>[redacted] pays a 30% fee on subscriptions that is not paid by [redacted]. Requires approximate 30% increase in price because of [redacted]. Note that this commission structure poses severe problems mainly for subscription apps that have high variable costs of providing service and that face competition from Apple on iOS. | Reduces conversions from free to paid because [redacted] is limited to promotions and pricing plans available through IAP and has to increase prices to cover Apple IAP fees.<br>Increases churn from paid to free because [redacted] cannot use payment processing to address various payment issues including providing grace periods for payments, messaging users about to churn, using re-trial logic to discouraging churn. |
| <b>[redacted] Restraints:</b> Apple bundles [redacted] with iOS, [redacted] and offers promotions and pricing in ways not available to [redacted] including directly messaging users about [redacted] promoting [redacted] in the [redacted] menu. | [redacted] is bundled with iOS and [redacted] Apple has opened SiriKit to third-party developers but excluded [redacted] apps.<br>Apple promotes [redacted] in ways not available to [redacted] such as directly messaging users and featuring [redacted] in the App Store, on the home screen, and in [redacted]  | Decreases free to paid conversions, increases paid churn, and reduces free user acquisition.  |

The effects of these restrictions on subscriber growth are cumulative and reinforcing. Marketing and payment restraints limit [redacted] ability to counter effects of [redacted] bundling.

Global Economics Group

14

# THE IMPACT OF APPLE'S VERTICAL RESTRAINTS ON [REDACTED] SUBSCRIBER GROWTH

Global Economics Group

15

## Two Natural Experiments



- Ø iOS and Android comparison before and after [REDACTED] introduction provides natural experiment.
  - § Based on analysis of [REDACTED] subscriber growth for users of iOS and Android devices January [REDACTED]-May [REDACTED].
  - § [REDACTED] App present on both iOS and Android before and after but without Apple vertical restraints on Android devices.
- Ø [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]
- Ø Neither natural experiment tests all Apple vertical restraints
  - § iOS-Android comparison cannot isolate impact of IAP marketing and payment restraints beyond competition with [REDACTED] because those restraints are present before and after [REDACTED] introduction.
  - § A/B Test concerns only one IAP Marketing and Payment Restraint and does not consider Apple's other vertical restraints that preference [REDACTED]

# Subscribers on Android and iOS Devices Provide Natural Experiment to Assess Counterfactual



## Ø iOS-Android Natural Experiment to Assess Counterfactual World without Restraints

- § Apple's vertical restraints do not apply to Android platform since [REDACTED] is distributed as app and since Google Play does not impose same vertical restraints as Apple Store.
- § Natural experiment for comparing effects using difference-in-difference estimator to control for unobserved differences between Android and iOS users in decision to use [REDACTED]
- § Compare change in demand for iOS users where [REDACTED] was bundled and [REDACTED] was subject to Apple's vertical restrictions with change in demand for Android users where Apple was not bundled and [REDACTED] was not subject to any vertical restrictions.

## Ø Estimation strategy

- § Difference in iOS and Android adoption creates significant noise for evaluating effects.
- § To obtain most precise estimates, focused on 11 countries in which iOS and Android adoption among [REDACTED] subscribers was stable. Austria, Australia, Belgium, Finland, France, Ireland, Netherlands, Norway, Poland, Sweden, and Switzerland. (Recommended approach for diff-in-diff estimates.)
- § To see whether estimates consistent with experience in other countries, also estimated equation for all 56 countries and compared results.

## Ø Dataset based on 374 observations for 11 countries and 1904 for 56

- § Monthly data for January [REDACTED] – May [REDACTED] (17 months).
- § Users with iOS devices and users with Android devices (2 groups).
- § In 11 countries yielding 374 (17 x 2 x 11) observations and in 64 countries 1904 (17 x 2 x 56) observations.

# Vertical Restraints for June 5-May for iOS and Android and Natural Experiment



| Restraint                        | June [REDACTED] |         | May [REDACTED] |         |
|----------------------------------|-----------------|---------|----------------|---------|
|                                  | iOS             | Android | iOS            | Android |
| [REDACTED] App                   | No              | No      | Yes            | Yes     |
| [REDACTED] restraints            | No              | No      | Yes            | No      |
| Marketing and payment restraints | Yes             | No      | Yes            | No      |

Ø For the purposes of the natural experiment available to us the "treatment" for iOS is the [REDACTED] vertical restraints and the incremental impact of the marketing and payment restraints given [REDACTED]

Ø Android is the "control group" because it has [REDACTED] as an app but without vertical restraints and does not have Apple's marketing and payment restraints, which could limit [REDACTED] ability to compete with [REDACTED]

# Difference-in-Difference Analysis Isolates Impact Apple's Vertical Restraints

## Ø Difference-in-difference analysis shows impact of treatment relative to control group measured by:

- § calculating the difference between the treatment and control group in the pre-treatment period as well as the treatment period to net out differences in the time periods studied and then
- § taking the difference of those differences between the two period to net out fixed unobserved differences related to the two groups.
- § Standard econometric method for analyzing natural experiments.

|                         | Jan - June | May | Percent Change in iOS Subscribers |
|-------------------------|------------|-----|-----------------------------------|
| iOS/Android Subscribers |            |     |                                   |

The calculations in the table show the basic difference-in-difference result for a two period analysis comparing beginning and end of "treatment" period for treatment and control group.

Analysis of 11 countries finds that the treatment—vertical restraints plus related impact of Apple's vertical restraints on ability to compete with reduced iOS subscribers

# Regression Analysis Examines Time Trend in Effects of Apple Vertical Restraints

| Difference in Differences for Log Subscriptions   |     |
|---|-----|
| Control Variables   |     |
| Post*   |     |
| Post* <sup>***</sup>  |     |
| Post* <sup>***</sup> *trend   |     |
| Pre*  |     |
| Pre* <sup>***</sup>   |     |
| Pre* <sup>***</sup> *trend  |     |
| Number of Countries   | 11  |
| Number of Observations  | 374 |
| <p>Standard errors clustered at the country level are reported.</p> <p>Column 2 based on 11 countries Austria, Australia, Belgium, Finland, France, Ireland, Netherlands, Norway, Poland, Sweden, and Switzerland.</p> <p>Column 3 based on all countries in which [REDACTED] operates and in which [REDACTED] was present on its launch date. *** indicates significant at 1% level, ** at 5% level, * at 10% level.</p> |     |

- Ø [REDACTED]
- Ø [REDACTED]
- Ø Results consistent with [REDACTED] and survey results in US (see summary slides below).
- Ø Similar results for estimates of impact on monthly active users. Noisiness of monthly active user data reduces precision of estimates.

*These are highly substantive and statistically significant foreclosure effects because (a) they pertain to an 11 month period of time, (b) show trend that is expected to continue resulting in increasing foreclosure effect over time, (c) apply to one market participant, and (d) are sufficient to tip [REDACTED] firms into failure over longer term (see financial analysis).*



## Estimated Regression Impact of Vertical Practices on Subscribers Expected to Continue



- Ø As with any new product launch more people will try the service over time moving from early adopters to late adopters (typical logistic curve for new production introductions).
  - § Consistent with estimated trend from diff-in-diff regressions.
- Ø Apple is expected to continue to develop its [REDACTED]
  - § Apple expected to launch new version of iOS (with new version of [REDACTED] and new iPhone this fall.
  - § The new version of [REDACTED] is viewed as a significant improvement over the initial version, which was reviewed unfavorably by many industry commentators.
  - § [REDACTED] is strategically important to Apple. Apple is likely to continue to make major investments in its [REDACTED] product.
- Ø [REDACTED] appears to have decreased [REDACTED] monthly active users on iOS versus Android based on diff-in-diff analysis (harder to measure precisely because of pre-existing noise).
  - § Expect that smaller pipeline of free users will reduce paid subscribers over time.
- Ø **Expect that Apple's vertical restraints will continue to reduce [REDACTED] paid subscribers over time and are not limited to initial [REDACTED] launch**
  - § Have assumed the estimated effects on [REDACTED] paid subscribers depreciate at [REDACTED].



## Impact on Conversions and Churn—U.S. Survey



### introduction combined with other restraints has likely resulted in significant subscriber loss based on survey of consumers

- Ø Survey of 1,278 US respondents in March found:
  - § iOS users who subscribed to in the month prior to the launch were **almost likely to cancel** by early March if they subscribed to (paid) than if they didn't subscribe to at all (free or paid).
- Ø Survey also found that Apple IAP restrictions that result in reduce conversions and increase churn.
  - § iOS users who never used were likely to report being likely to use at a price of vs.
  - § Former iOS users were more than likely to report being likely to return to at a price of than at a price of.
- Ø impact on conversions and churn in practice exacerbated by:
  - § Bundling and integration of in iOS
  - § Restraints on marketing and promotion to free users
  - § Restraints on ability to retain paid users
  - § Marketing and promotion advantages available to but not to

**Survey results don't distinguish impact of vertical restraints from introduction of new service. They are consistent with, and support regression estimates, because they imply effects much greater than regression estimates**



Global Economics  
GROUP

[illegible]

## Estimates of Impact of Just One IAP Restriction—



- Ø Estimated impact is **lower bound** on actual impact
  - \$ Test is only of one aspect of IAP (and other) restrictions imposed by Apple.
  - \$ [Redacted] likely to improve conversion rate if free to experiment with promotional offers in iOS app.
  - \$ Being able to solicit customers within the app rather than through a link would likely be more effective.

*These estimates incorporate the effect of relaxing this one IAP-restriction on reducing losses to [Redacted] as well as increasing conversions from free to paid that are unrelated to [Redacted]*

# IMPACT OF VERTICAL PRACTICES ON [REDACTED] VIABILITY AND PATH TO PROFITABLE GROWTH

Global Economics Group

26

# Methodology for Projections of Financials With and Without Vertical Practices

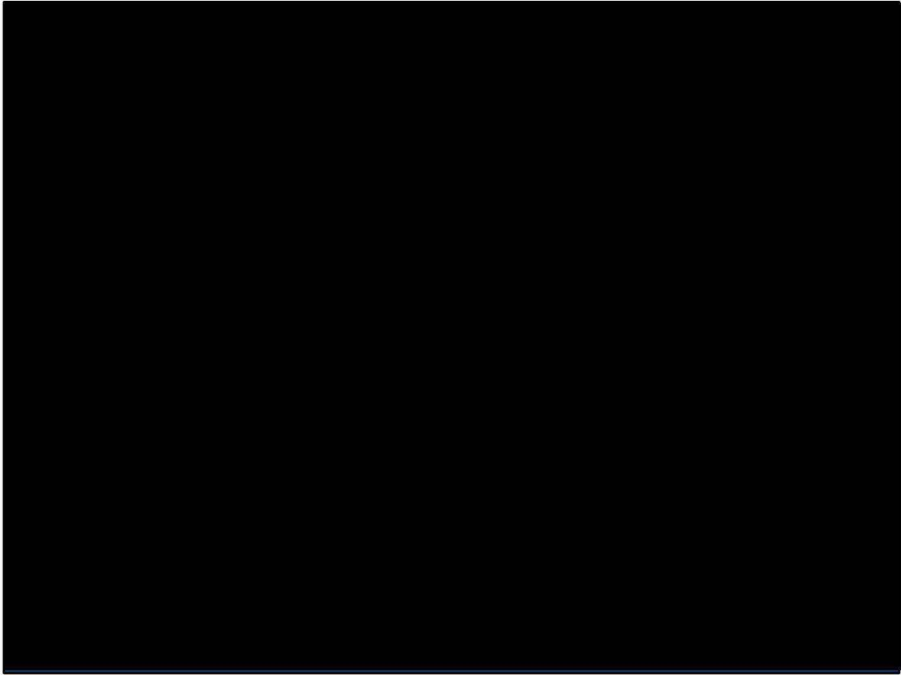


## Ø Methodology for Forecasting ██████████ Financials

- § Used ██████████ financial data drawn from P&Ls from ██████████ Q1 through ██████████ Q2 and corresponding data on the number of free users and subscribers during the same time period.
- § Calculated key financial metrics (such as revenue per subscriber) and calculated quarterly growth through ██████████ Q2 before ██████████
- § Projected financial metrics from ██████████ Q2 through ██████████ Q1 by growing or reducing the metric based on the cumulative quarterly compound growth rate from ██████████ Q2 through ██████████ Q2.
- § The revenues and costs above were calculated based on the estimated number of users and the metrics calculated above.
- § R&D and G&A costs were estimated based on a regression line on the historic costs and the number of users from ██████████ Q1 through ██████████ Q2.

## Ø Methodology for Forecasting Subscribers With and Without Vertical Practices

- § Use results of iOS-Android natural experiment which has the more inclusive set of restraints.









Global Economics  
GROUP

- u Lost margin could be used to fund growth initiatives from free cash flow or avoid costly debt financing or some combination of the two.
- u Apple's vertical restraints pose significant risk to [REDACTED] ability to develop global [REDACTED] platform as a result of delayed profitability, risks to access to growth capital, and to operate a viable stand-alone business.
- u Apple's vertical practices would be expected to have similar effects on other [REDACTED] companies and to discourage investments in VC-backed startups.

## Apple's Vertical Restraints Have Likely Harmed Other Rivals



Global Economics Group

31

# ECONOMIC ANALYSIS OF APPLE'S APP STORE BUSINESS

Global Economics Group

32

# Apple's Practices for Earning Revenues from Apps

## Ø Apple Earns No Revenue from Most Apps...

- \$ Ad-supported apps like Facebook
- \$ Brand apps like Air France
- \$ Shopping apps like Amazon
- \$ Payment apps like Venmo
- \$ Physical apps like Uber

## Ø Even though these apps earn their owners significant revenues and profits.

Ø [REDACTED]

Ø [REDACTED]

Top Apps by Minutes of Use, US, March 2016

| Rank (minutes) | App                  | Model                         | Apple Revenue |
|----------------|----------------------|-------------------------------|---------------|
| 1              | Facebook             | Ads                           | No            |
| 2              | Pandora Radio        | Ads+Subscription              | Yes           |
| 3              | YouTube (Google)     | Ads                           | No            |
| 4              | Spotify              | Ads+Subscription              | Yes           |
| 5              | SwagBucks TV Mobile  | Ads                           | No            |
| 6              | Instagram (Facebook) | Ads                           | No            |
| 7              | Google Search        | Ads                           | No            |
| 8              | Facebook Messenger   | Free                          | No            |
| 9              | Snapchat             | Ads                           | No            |
| 10             | Verizon Messages     | Ads+Gift Card Sales (non-IAP) | No            |

# Apple Uses Apps to Drive iOS Device Adoption and Profits



## Ø Apple earns a small portion of iOS-related revenue from the App Store:

- § Mobile device revenue = \$177 billion
- § App Store revenue = \$20 billion
- § App Store as percent of mobile device revenue = 11%
- § App store as a percent of mobile device margin < 6% (using industry estimates of a 60% device margin and <30% margin from app store after developer share)

## Ø Apple's Business Model for App Store based on selling handsets and driving positive feedback effects

- § Apple earns >\$400 average profit per handset
- § Consumers in US spend around 75% of time using mobile phones to access apps which are therefore key driver of adoption and use.
- § Apple invested in App Store to stimulate development of apps which drive value. Now more than 2 million

"[T]he limited revenue that Apple generates from the App Store doesn't imply that it's irrelevant - rather, analysts argue the App Store and the apps inside are an essential element of Apple's offering." "Apple makes margin mostly by selling hardware, but apps are really what creates the loyalty to the ecosystem, be it from a consumer standpoint or for developers." (ZDNet, "iOS versus Android. Apple App Store versus Google Play: Here comes the next battle in the app wars," 16 January 2015)

## App Developer Commission Unusual for OS Platforms



- Ø Windows and MacOS do not assess fees on applications that run on their desktop platforms.
- Ø Apple and Google do not impose any fees on most applications for their mobile platforms including:
  - § Ad-supported apps like Facebook
  - § Brand apps like Air France
  - § Shopping apps like Amazon
  - § Payment apps like Venmo
  - § Physical apps like Uber
- Ø Google does not require digital content apps to use their payment processing systems and pay commission although some apps choose to do so.
- Ø All of these platforms have made business decision to promote the development of apps in order to generate positive feedback effects to promote the adoption and use of their platforms.

## Effect of Apple's Commission Structure on Apps vs. Other Digital Content Apps



- Ø Most digital content apps such as games have zero marginal costs of providing the in-app services. Therefore Apple commission results in Apple receiving 30% of the margin and app developer receiving 70%, with a 30/70 split favoring the developer.
  - § \$10 in app purchase results in gross contribution margin of \$10.
  - § Apple gets \$3.00 and app gets \$7.00.
- Ø [REDACTED] and other [REDACTED] apps have significant marginal costs of providing the in-app service because of [REDACTED]. After paying the Apple 30% fee, Spotify only keeps [REDACTED] of the remaining revenue after paying [REDACTED]. Therefore Apple commission results in Apple receiving most of margin from transaction. (Figures are illustrative.)
  - Ø \$10 in-app purchase.
  - Ø Apple gets \$3.00.
  - Ø [REDACTED] pays [REDACTED] in [REDACTED] only keeps [REDACTED]



# CONCLUSION

## Competitive Effects of Apple's Vertical Restraints



- Ø **Apple's vertical restraints are estimated to result in substantial foreclosure of competition in the provision of [REDACTED]**
  - § [REDACTED]
  - § Other [REDACTED] providers such as [REDACTED] will face similar effects.
  - § Restraints could also suppress entry of new firms.
- Ø **Impact of Apple's vertical restraints likely to be magnified because of the need to [REDACTED] and other [REDACTED] providers to secure risk capital to fund growth of global platforms.**
  - § Lower growth, delayed, and lower margins likely to reduce access to risk capital and increase cost.
  - § [REDACTED] and other [REDACTED] providers would be foreclosed from even more of the market because they wouldn't have sufficient funding to invest in R&D and invest in subscriber acquisition.
- Ø **Apple's vertical restraint risk *complete foreclosure* of [REDACTED] providers.**
  - § [REDACTED] and other [REDACTED] providers cannot operate viable businesses if they cannot earn sufficiently large net margins to invest in their businesses.
  - § Sustained negative margins for [REDACTED] and other [REDACTED] providers threatens their ability to exist at least as global platforms.

# APPENDIX

# Definitions



- Ø Gross Margin: total revenues, less cost of content, less other cost of sales
- Ø Segment Contribution is the Total Revenues for the segment, less content costs for the segment, less other cost of sales for the segment, less direct sales and marketing costs for the segment. (Segment contribution is equal to the Gross Margin, less the direct selling and marketing expenses)
- Ø Margin: total revenues, less cost of content, less other cost of sales, less sales and marketing, less research and development less general and administrative. This is essentially, the EBIT. Margin is equal to segment contribution less the indirect sales and marketing, less research and development and less general and administrative costs.